

REMARKS

Claims 1-8, 10-16 and claims 21-28 are pending in the application, claims 1-8, 10-16, and 18-28 stand rejected. The Examiner's reconsideration of the rejection in view of the following remarks is respectfully requested.

Claims 1-8 and 21-28 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Thakur et al. (US 5,913,149) in combination with Schachameyer et al. (US 4,940,505) and further in view of Ho et al. (US 5,643,823).

To establish a prima facie case of obviousness, at the very least, the prior art references must teach or suggest all the claim limitations. In addition, there must be some suggestion or motivation in the references or in the knowledge generally available to one skilled in the art to combine the reference teachings. (See, e.g., MPEP 2141, 2413, 2143.03). Here, it is respectfully submitted that at the very minimum, the combination of Thakur, Schachameyer and Ho fails to establish a prima facie case of obviousness against claims 1 and 21.

To begin, the combination of Thakur, Schachameyer and Ho does not disclose or suggest elements of claims 1 and 21. For instance, Applicants respectfully submit that Thakur does **not** disclose forming a continuous crystalline silicon nitride layer as claimed in claim 1 and 21.

Examiner's reliance on Thakur, Col. 1, lines 61-62, as disclosing a continuous crystalline silicon nitride layer, is misplaced. In contrast, although Thakur discloses (in the cited section) forming a silicon nitride layer, Thakur expressly teaches that the silicon nitride layer is formed by an RTN process and that "RTN-type ultrathin dielectrics lack uniformity in their overall composition." (Column 1, lines 65). In other words, RTN does not form crystalline silicon nitride.

Furthermore, Examiner has also acknowledged that the references do not disclose

performing precleaning by hydrogen prebake after an amount of time has elapsed from the native oxide removal step, but the Examiner states that the duration of delay would have been a matter of routine optimization within the teachings of the references. Applicants respectfully disagree.

Indeed, Applicants respectfully assert that Thakur teaches away from a specified duration of time because Thakur specifically states that one of the “objects of the present invention is to provide to a method of fabricating an ultrathin dielectric layer independent of processing time.” (Thakur, Col. 2, lines 51-52, emphasis added). Therefore, Thakur teaches that processing time would not have been a matter of routine optimization within the teachings of its disclosure.

Further, Ho does not cure the deficiencies of Thakur and Schachameyer. Although Ho discloses, crystalline silicon nitride, the process of forming silicon nitride as disclosed by Ho is entirely different from the **process** of claims 1 and 21. Therefore, the combination of Thakur, Schachameyer and Ho fail to **disclose** elements of claim 1 and 21.

Even assuming, *arguendo*, the combination of Thakur, Schachameyer and Ho discloses all the elements of claim 1 and 21, Applicants respectfully submit there is no motivation or suggestion in their teachings for one of ordinary skill in the art to combine the teachings of the cited references. To begin, Thakur does **not** disclose forming a continuous crystalline silicon nitride layer, for the reasons stated above. Further, Schachameyer discloses forming *a crystalline silicon layer*, which is entirely different than *a continuous crystalline silicon nitride layer*. Moreover, although, as discussed above, Ho discloses a method of forming a largely crystalline silicon nitride layer, the method of Ho comprises first forming an amorphous silicon nitride layer and then annealing the film to cause the amorphous layer to become largely crystallized (Col. 2, lines 55-66). Thus, the Ho process has no relation to the claimed inventions.

Further it is respectfully submitted that the Examiner's contention that "the process of the combination would result in formation of a crystalline silicon nitride because the same materials would be treated in the same manner as the instant invention," is nothing more than impermissible hindsight reasoning based on Applicant's disclosure. Indeed, Examiner must demonstrate motivation for such combination through objective teachings in the cited references. However, as described above, neither Thakur nor Schachameyer, remotely disclose forming crystalline silicon nitride. In fact, as mentioned above, Schachameyer is merely directed to a method for forming crystalline silicon, not silicon nitride.

Therefore, the Applicants respectfully submit that one of ordinary skill in the art would not be motivated to combine the teachings of Thakur, Schachameyer and Ho to derive the inventions of claim 1 and 21, for at least the reasons stated above.

Therefore, claims 1 and 21 are believed to be patentable and nonobvious by the combination of Thakur, Schachameyer and Ho.

Claims 2- 8 depend from independent claim 1, and claims 22-28 depend from independent claim 21. Thus, these claims are allowable for at least the same reasons given for their respective base claims 1 or 21.

Claims 10-16, the Examiner stand rejected under 35 U.S.C. §103(a) over Thakur in combination with Schachameyer and further in view of Ho as applied to claims 1-8 and 21-28 above, and further in view of Wolf, Vol. 2.

Applicants respectfully submit that, at the very minimum, claim 10 is patentable and nonobvious over such combination distinct for at least the reasons as stated above for claims 1 and 21. Indeed, claim 10 recites, *inter alia*, "...precleaning the exposed surfaces by employing

hydrogen prebake after an amount of time has elapsed after the removal step...to grow a continuous crystalline silicon nitride layer..."

Further, Wolf does not cure the deficiencies of Thakur and Schachameyer. Namely, Wolf does not teach or disclose "to grow a continuous crystalline silicon nitride layer," nor does Examiner contend so. Thus, the combination of Thakur, Schachameyer, Ho and Wolf does not render claim 10 obvious.

Claims 11-16 depend from independent claim 10, and are, thus are allowable for the same reasons given for claim 10.

In view of the foregoing remarks and amendments, it is respectfully submitted that all the claims now pending in the application are in condition for allowance. Early and favorable reconsideration of the case is respectfully requested.

Respectfully submitted,



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